

REMARKS

REJECTION UNDER 35 USC §103(A)

The examiner maintains rejection of claims 1-2 and 4-5 under 35 USC §103(a) as obvious over the disclosure of Kashiwa et al., US 4,668,753, for reasons set forward in the previous office action (cited as "Paper no.12" hereinafter). This rejection is again respectfully traversed.

In the first office action, the examiner argued that the presently claimed process for producing biaxially oriented polypropylene copolymer films used a catalyst composition "substantially identical" to that disclosed in Kashiwa, which would therefore yield copolymers having identical or substantially identical properties to those of Kashiwa. Applicants responded to this argument by indicating that the catalyst composition was not as similar as the examiner implied, showing that Kashiwa teaches away from the present ethylene range, and arguing against the examiner's assertion of inherency. The examiner has responded to each of these points in the most recent office action, and maintains the rejection.

In making a rejection under 35 USC §103(a), the examiner shoulders a burden to demonstrate that each and every claim limitation is either disclosed or suggested by either the reference(s) or the prior art, and that some suggestion or motivation is also present that would spur one of ordinary skill in the art to pursue a course leading to the claimed invention. If one or more of the claim limitations are argued by the examiner to be inherently present in the prior art, the examiner shoulders an additional burden to demonstrate that one of ordinary skill in the art would see that limitation to *necessarily*

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result from the prior art disclosure.

The examiner argued in paper no.12 that the present catalyst and that of Kashiwa are “substantially similar,” that the resulting copolymers would be “substantially identical,” and that Kashiwa’s copolymers would inherently possess the presently claimed properties. In paper no.14, the examiner argued that the microstructure of a copolymer is controlled by the catalytic center of the catalyst, and that the catalytic center of a particular catalyst is not affected by the polymerization phase or the inorganic oxide support. The examiner concludes that as the active ingredients of the catalysts at issue are substantially identical, the microstructure of the resulting copolymers would also be identical, implying that the differentiating claim elements are inherent.

Applicants agree that the microstructure of a copolymer is controlled by the catalytic center, and yet catalytic centers result from an interaction of several different factors, rather than being directly correlated with the ingredient mix. For instance, the catalyst preparation technique, specific internal and external donor pair, and the specific ratios between Ti, Mg, and Al compounds and donors all have an effect on the ultimate structure of the catalytic center. Kashiwa’s catalyst differs from the present catalyst in having a lower internal donor to $MgCl_2$ ratio, in using a different 2nd titanation procedure (using a lower temperature and a different medium), in using $MgCl_2$ directly, rather than deriving it from chlorination of an organomagnesium precursor, and in not using an inorganic oxide as co-support. These specific differences result in a different distribution of catalytic centers.

Additionally, the external donor and the aluminum compound/external donor ratio both differ between the present catalyzation procedures, and one of ordinary skill in the art recognizes that these factors strongly influence comonomer insertion, resulting in differing microstructure function. Finally, differences in copolymer structure can be introduced through polymerization techniques themselves. For instance, gas-phase polymerization in the present invention involves different propylene and ethylene reactant concentrations, higher temperatures, and improved mixing conditions, when compared to Kashiwa.

An assumption that the presently claimed process will produce polymers "substantially identical" to those of Kashiwa is not solidly supported by the vast range of variables which the examiner has yet to consider. Applicants respectfully submit that they have met their burden to rebut the examiner's reasoning as to the inherency of cold-xylene-soluble fraction and processability index as presently claimed. The burden now shifts to the examiner to demonstrate why these claim elements would *necessarily* be present in the Kashiwa polymers, from the point of view of the ordinarily skilled artisan and in light of the above discussion.

The examiner's argument that Yamagihara et al., EP 0 712 869, demonstrates a correlation between xylene-soluble fraction decrease and isotacticity increase is based on a single disclosure, and cannot be said to have been clearly established as a generally accepted trend. Such correlation is strongly dependent on the particular catalytic system and the specific comonomer content. The Yamagihara results are valid *only* to the extent of their disclosure and applicability, which is limited to

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interpretation of data for specific propylene homopolymers created using a specific catalytic system. No correlation between xylene-soluble content and triads tacticity in polypropylene/ethylene copolymers is suggested, and the examiner has given no reasons or objective evidence to suggest that one of skill in the art would extrapolate a general applicability therefrom.

Accordingly, applicants submit that the examiner has not met her burden in demonstrating that one of skill in the art would *necessarily* view the presently claimed xylene-soluble fraction and processibility index values in the Kashiwa polymers of specified triads tacticity (%). Further, the examiner has not established that one of skill in the art would be able to make the suggested correlation between triads tacticity and xylene-soluble fraction for polypropylene/ethylene comonomers having the presently claimed ethylene comonomer fraction. The burden now rests on the examiner to objectively demonstrate that one of skill in the art would come to such a conclusion.

With regard to the examiner's statements concerning overlap of the present ethylene content ranges with those of Kashiwa, and that reference's teaching-away from the present range, applicants respectfully submit the following remarks. Kashiwa discloses an ethylene content range of 0.1-2.0 mol%, which corresponds roughly to 0.2-1.0 wt%. The present claims require an ethylene content of 0.7-1.4 wt%, giving an overlap at 0.7-1.0 wt%, and an undisclosed range in the claims of from greater than 1.0% to 1.4 wt%, and the ranges do not entirely overlap. The examiner suggests that 2.0 mol% is equivalent to 1.3 wt%, but even using that calculation, the point is still valid, and Kashiwa's range does not, in fact, "encompass[] that of the instant claims." Paper

The examiner suggests that one of ordinary skill in the art would be motivated by Kashiwa to increase ethylene copolymer content from the preferred 0.2-0.6 wt% range, because it would be understood "that as the ethylene content of the propylene ethylene copolymer increases, the isotacticity of the copolymer decreases, and the processability of the copolymer ... would be improved because the copolymer is less crystalline."

Paper No.12, p.3. In support of this conclusion, the examiner cites Kashiwa at column 2, lines 2-33, which discusses various deficiencies Kashiwa perceived in the prior art. In particular, Kashiwa cites a patent document in which propylene is copolymerized with 0.1-1.0 wt% ethylene, which "improve[s] the stretchability" of the polymer, but "abruptly decreases" the isotactic index, thus yielding copolymers with low rigidity and stiffness. Col.2:4, 18-21. Kashiwa also discloses other attempts to copolymerize propylene with small amounts of ethylene, which "resulted in degraded transparency or rigidity." Col.2:26-33. This cited portion of Kashiwa states that propylene copolymers having even a small amount of ethylene are unsuitable for industrial applications, and applicants are unable to ascertain the motivation and teaching the examiner draws therefrom. Applying these teachings to the present claims, one of skill in the art would likely conclude that an even higher ethylene content would only increase the detrimental effects produced by ethylene copolymerization, and would not be motivated to raise the ethylene comonomer content.

Kashiwa's remedy for these prior art challenges is to require a specified correlation between ethylene content and isotactic index in the propylene copolymers.

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According to the Kashiwa disclosure, therefore, polypropylene/ethylene copolymers *only* work satisfactorily when the ethylene content and isotactic index are correlated.

Given that isotactic index and cold-xylene-soluble fraction are not *generally* correlative, one of skill in the art would not be motivated to interchange these two values.

Accordingly, no teaching in either Kashiwa or generally held in the art suggests the claimed copolymers, with an ethylene content of from 0.7-1.4 wt% and a cold-xylene-soluble fraction of from 1.0-2.5 wt%. Kashiwa neither discloses nor suggests that copolymers within such parameters would have *improved* processability and a good balance of stiffness, toughness, and transparency.

Kashiwa specifically teaches that "if the ethylene content ... is higher than the specified limit, it is difficult to provide a propylene copolymer having satisfactory rigidity in combination with other desirable properties." Col.3:41-44. Additionally, from working examples 1-3, it is seen that isotacticity decreases with increasing ethylene content, and one of skill in the art would recognize this, together with the discussion concerning the prior art, to suggest that ethylene levels above Kashiwa's optimal ranges would likely be unsuitable or difficult to work with. Accordingly, there would be no motivation for the skilled artisan to pursue the upper ranges of ethylene disclosed in Kashiwa, or to exceed these ranges, as Kashiwa taught this to be less suitable than lower ranges.

Further, Example 1 and Comparative Example B of the present invention demonstrate that the claimed copolymers differ from those of Kashiwa. These examples utilized identical catalysts, and differ only in the amount of ethylene comonomer and the particular reaction conditions. In Example 1, propylene was

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copolymerized with 1.1 wt% ethylene, and in Comparative Example B, the ethylene content was only 0.5%. However, the resulting copolymers each show the same value of mm triads, *i.e.*, 98.7%. See Table 2 of the present specification.

In light of the above remarks, applicants respectfully submit that one of skill in the art would not have been motivated to modify the disclosure of Kashiwa, by disregarding the requirement for correlation between ethylene content and the isotactic index value and requiring a specific range of xylene-soluble fraction values and expanded the possible ethylene content. One of skill in the art would not have recognized that making these changes would lead to improved processability and a very good balance of stiffness, toughness, and transparency. Applicants respectfully request that the examiner withdraw the rejection under 35 USC §103(a) and pass the application to allowance. Should the examiner feel that discussion in-person or by telephone would serve to assist in resolving any concerns, applicants respectfully request the opportunity to do so.

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